l: Krasheninnikov N-5 (1736-40) 1764 Kamchadal

chatka expedition upon the haven of *Petropaulauſkay*. Its great beauty is its church, which is finely ſituated, and very well built. This fort has almoſt the ſame advantages and diſadvantages as the *Bolſcheretſkoi* fort, with this difference, that here the hunting of the beaver is more convenient; but the water is bad and unwholſome, ſo that they ſend frequently from this bay to the river *Awatſcha* for their freſh water.

We can give no account of the fifth fort, which was built upon the river *Tegbil* after my departure from *Kamtſchatka*. It was garriſoned with 37 male inhabitants. Mr. *Steller* tells us, that this fort was built with a view to reſtrain the ſettled *Koreki*, and for a ſtage to thoſe who travel round the *Penſchinſka* ſea to *Ochotſka*; and, in caſe of neceſſity, to protect the rein-deer or wandering *Koreki* againſt the *Tchukotſkoi*. The inhabitants of this fort can deprive thoſe of the lower *Kamtſchatka* fort of ſeveral advantages, becauſe they lie more convenient for hunting the ſable upon the river *Tegbil*, and the *Koreki* rather chuſe to bring their goods to them than to the two other forts, as being nearer.

CHAP. VI.

Of the Manner in which the Coſſacks live there; of their DISTILLERY, PROVISIONS, *&c.*

THE Coſſacks of *Kamtſchatka* live almoſt in the ſame manner as the natives, feeding like them upon roots and fiſhes; and their occupations are nearly the ſame. In the ſummer they catch fiſh for their winter proviſion, and gather nettles, of which they make nets. Their difference only ſeems

000 it ſeemed ſufficiently ſheltered, the wind penetrated on every ſide. M. Kaſloff had recourſe to the bath, which quickly reſtored him; but not daring to follow his example, I was obliged to wait the arrival of our baggage. The damp had penetrated to ſuch a degree that I ſhivered during the whole night.

133
515
312
343 The next day I made a trial of theſe baths, and can ſay that none ever afforded me ſo much pleaſure or ſo much benefit. But before I proceed, I muſt deſcribe the ſource of theſe hot waters, and the building conſtructed for bathing.

They are two werſts to the north of the oſtrog, and about a hundred yards from the bank of the Bolchaia-reka, which it is neceſſary to croſs a ſecond time in order to arrive at the baths, on account of the elbow which the river deſcribes below the village. A thick and

[Natchikin (Nachiki?)--Analyst]

7:Lesseps T-3 (1787-88)1790 Kamchadal

133 and continual vapour aſcends from theſe
515 waters, which fall in a rapid caſcade from a
312 rather ſteep declivity, three hundred yards
343 from the place where the baths are erected. In their fall, which is in a direction eaſt and weſt, they form a ſmall ſtream of a foot and half deep, and ſix or ſeven feet wide. At a little diſtance from the Bolchaia-reka, this ſtream is met by another, with which it pours itſelf into this river. At their conflux, which is about eight or nine hundred yards from the ſource, the water is ſo hot that it is not poſſible to keep the hand in it for half a minute.

M. Kaſloff has been careful to erect his building on the moſt convenient ſpot, and where the temperature of the water is moſt moderate. It is conſtructed of wood, in the middle of a ſtream, and is in the proportion of ſixteen feet long by eight wide. It is divided into two apartments, each of ſix

or

7:Lesseps T-3 (1787-88)1790 Kamchadal

133 or ſeven feet ſquare, and as many high:
312 the one which is neareſt to the ſide of
515 the ſpring, and under which the water is
343 conſequently warmer, is appropriated for bathing; the other ſerves for a dreſſing-room; and for this purpoſe there are wide benches above the level of the water; in the middle alſo a certain ſpace is left to waſh if we be diſpoſed. There is one circumſtance that renders theſe baths very agreeable, the warmth of the water communicates itſelf ſufficiently to the dreſſing-room to prevent us from catching cold; and it penetrates the body to ſuch a degree, as to be felt even for the ſpace of an hour or two after we have left the bath.

We lodged near theſe baths in a kind of barns, covered with thatch, and whoſe timber work conſiſted of the trunks and branches of trees. We occupied two, which had been built on purpoſe for us, and

7:Lesseps T-3 (1787-88)1790 Kamchadal

177 515 757 823 The various conſtructions which M. Kaſloff ordered for the greater convenience of his eſtabliſhment, detained us two days longer. Animated by a love of virtue and humanity, he enjoyed the pleaſure of having procured theſe ſalutary and pleaſant baths for his poor Kamtſchadales. The uninformed ſtate of their minds, or perhaps their indolence, would, without his ſuccour, have deprived them of this benefit, notwithſtanding their extreme confidence in theſe hot ſprings for the cure of a variety of diſ-
312 eaſes*. This made M. Kaſloff deſirous of aſcertaining the properties of theſe waters; we agreed to analyſe them, by means of a proceſs which had been given him for this purpoſe. But before I ſpeak of the reſult of our experiments, it is neceſſary to tranſcribe the proceſs, in order the better to trace the mode we adopted.

* Formerly they dared not approach theſe ſprings, or any volcano, from the idea that they were the abode of evil ſpirits.

Water

[The Governor-General of Okhotsk and Kamchatka--Analyst]

7: Lesseps T-3 (1787-88) 1790 Kamchadal

312 " Water in general may contain,

" 1. Fixed air; in that caſe it has a " ſharp and ſouriſh taſte, like lemonade, " without ſugar.

" 2. Iron or copper; and then it has " an aſtringent and diſagreeable taſte, like " ink.

" 3. Sulphur, or ſulphurous vapours; and " then it has a very nauſeous taſte, like " a ſtale and rotten egg.

" 4. Vitriolic, or marine, or alkaline ſalt.

" 5. Earth."

Fixed Air.

" To aſcertain the fixed air, the taſte is " partly ſufficient; but pour into the water " ſome tincture of turnſol, and the water " will

7:Lesseps T-3 (1787-88)1790 Kamchadal

312 " will become more or leſs red, in propor-
" tion to the quantity of fixed air it con-
" tains."

Iron.

" The iron may be known by means of
" the galnut and phlogiſticated alkali; the
" galnut put into feruginous water, will
" change its colour to purple, or violet, or
" black; and the phlogiſticated alkali will
" produce immediately Pruſſian blue."

Copper.

" Copper may be aſcertained by means
" of the phlogiſticated alkali or volatile al-
" kali; the firſt turns the water to a brown
" red, and the ſecond to a blue. The laſt
" mode is the ſureſt, becauſe the volatile
" alkali precipitates copper only, and not
" iron."

Sulphur.

7: Lesseps T-3 (1787-88) 1790 Kamchadal

Sulphur.

312 " Sulphur and ſulphurous vapours may " be known by pouring, 1. nitrous acid into " the water; if a yellowiſh or whitiſh ſedi- " ment be formed by it, there is ſulphur, and " at the ſame time a ſulphurous odour will " be exhaled and evaporate. 2. By pouring " ſome drops of a ſolution of corroſive ſubli- " mate; if it occaſion a white ſediment, the " water contains only vapours of liver of " ſulphur; and if the ſediment be black, the " water contains ſulphur only.

Vitriolic Salt.

" Water may contain vitriolic ſalts; that " is ſalts reſulting from the combination of " the vitriolic acid with calcareous earth, " iron, copper, or with an alkali. The vi- " triolic acid may be aſcertained by pouring " ſome drops of a ſolution of heavy earth; " for then a ſandy ſediment will be formed, " which will ſettle ſlowly at the bottom of " the veſſel.

Marine

7:Lesseps T-3 (1787-88)1790 Kamchadal

312

Marine Salt.

" Water may contain marine ſalt, which " may be aſcertained by pouring into it ſome " drops of a ſolution of ſilver; a white ſedi- " ment will immediately be formed of the " conſiſtency of curdled milk, which will at " laſt turn to a dark violet colour.

Fixed Alkali.

" Water may contain fixed alkali, which " may be aſcertained by pouring into it " ſome drops of a ſolution of corroſive ſub- " limate; when a reddiſh ſediment will be " formed.

Calcareous Earth.

" Water may contain calcareous earth " and magneſia. Some drops of acid of " ſugar poured into the water, will preci- " pitate the calcareous earth in whitiſh " clouds, which will at length ſubſide and

7:Lesseps T-3 (1787-88)1790 Kamchadal

312 " afford a white ſediment. A few drops of
" a ſolution of corroſive ſublimate, will pro-
" duce a reddiſh ſediment, but very gra-
" dually, if the water contain magneſia.

" Note. To make theſe experiments with
" readineſs and certainty, the water to be
" analyſed ſhould be reduced one half by
" boiling it, except in the caſe of the fixed
" air, which would evaporate in the boiling."

Having thoroughly ſtudied the proceſs, we began our experiments. The three firſt producing no effect, we concluded that the water contained neither fixed air, iron, nor copper; but upon the mixture of the nitrous acid, mentioned for the fourth experiment, we perceived a light ſubſtance ſettle upon the ſurface, of a whitiſh colour, and extending but a little way, which led us to believe that the quantity of ſulphur, or

of

7:Lesseps T-3 (1787-88)1790 Kamchadal

312 of fulphurous vapours, muſt be infinitely ſmall.

The fifth experiment proved that the water contained vitriolic ſalts, or at leaſt vitriolic acid mixed with calcareous earth. We aſcertained the exiſtence of this acid, by pouring ſome drops of a ſolution of heavy earth into the water, which became white and nebulous, and the ſediment that ſlowly ſettled at the bottom of the veſſel appeared whitiſh and in very fine grains.

We had no ſolution of ſilver for the ſixth experiment, in order to aſcertain whether the water contained marine ſalt.

The ſeventh proved that it had no fixed alkali.

By the eighth experiment, we found that the water contained a great quantity of

7:Lesseps T-3 (1787-88)1790 Kamchadal

312 calcareous earth, but no magnesia. Having poured some drops of acid of sugar, we observed the calcareous earth precipitate to the bottom of the vessel in clouds and a powder of a whitish colour; we mixed afterwards some solution of corrosive sublimate to find the magnesia; but the sediment, instead of becoming red, preserved the same colour as before; a proof that the water contained no magnesia.

We made use of this water for tea and for our common drink. It was not till after three or four days that we found it contained some saline particles.

M. Kasloff boiled also some of the water taken at the spring, till it became totally evaporated; the whitish and very salt earth or powder which remained at the bottom of the vessel, as well as the effect it produced on

7:Lesseps T-3 (1787-88)1790 Kamchadal

312 on us, proved that this water contained nitrous ſalts.

We remarked alſo that the ſtones taken out of this ſtream were covered with a calcareous ſubſtance tolerably thick, and of an undulated appearance, which, when mixed with the vitriolic and nitrous acid, produced ſymptoms of effervescence. We examined others taken from what appeared to be the fountain head of the waters, and where they have the greateſt degree of heat; we found them covered with a ſtratum of a kind of metal, if I may ſo call a hard and compact envelopement of the colour of refined copper, but the quality of which we could not aſcertain; we found alſo ſome of this metal, which appeared like the heads of pins; but no acid could diſſolve it. Upon breaking theſe ſtones, we diſcovered the inſide to be very ſoft and mixed with gravel,

7: Lesseps I-3 (1787-88) 1790 Kamchadal

312 with which I had obſerved theſe ſtreams to abound.

I ought to add here, that we diſcovered upon the border of the ſtream, and in a little moving ſwamp that was near it, a gum, or ſingular *fucus**, that was glutinous, but did not adhere to the ground.

Such are the obſervations which I made upon theſe hot waters, by aſſiſting M. Kaſloff in his experiments and enquiries. I dare not flatter myſelf with having given the reſult of our operations in a ſatisfactory manner; forgetfulneſs, or want of information upon the ſubject, may have led me into errors; I can only ſay that I have exerted all my attention and care to be accurate; but acknowledge at the ſame time,

* M. Kaſloff gave ſome of this gum to one of the naturaliſts of our expedition, the abbé Mongés, while the frigates were at Saint Peter and Saint Paul.

that

?:Lesseps T-3 (1787-88)1790 Kamchadal

312 that if there be defects, they are aſcribable to me.

During our ſtay at theſe baths and at the oſtrog of Natchikin, our horſes had brought, at different times, the effects which we had left at Koriaki, and we began to make pre-
224 parations for our departure. In this interval I had an opportunity of ſeeing a ſable taken alive; the method was very ſingular, and may give ſome idea of the manner of hunting theſe animals.

At ſome diſtance from the baths, M. Kaſloff remarked a numerous flight of ravens, who all hovered over the ſame ſpot, ſkimming continually along the ground. The regular direction of their flight led us to ſuſpect that ſome prey attracted them. Theſe birds were in reality purſuing a ſable. We perceived it upon a birch-tree, ſurrounded by another flight of ravens, and

29:Cochrane T-2(1821-22)1824 Kamchadal

758 nothing either to the industry or humanity of the
R doctor before alluded to.
177 The state of some of those miserable creatures
.75 whom I saw in the hospital, was such as absolutely to prevent the doctor from dressing their wounds; of course I am incapable of describing them. They are allowed by the Emperor one pound of bread and half a pound of meat per day. They have also fish in abundance, and wild berries are to be found every where round the place. The patients, being all afflicted with one disease, are cramped up into one small space, never to go out but at their own desire, nor do any work, though they might raise an unlimited quantity of vegetables from the grounds covered with the warm vapour. In short, instead of being as it is, a place calculated to engender and nourish disease almost to pestilence, it might be, at a trifling expense and with proper care on the part of the head doctor, one of the most humane and efficient establishments on the face of the globe.

312 With respect to the nature and quality of the baths, they had a strong smell of sulphur, and an unpleasant taste. The hot and cold springs are united at the baths, and it is a strange circumstance, that the one should always be boiling hot in 25° of frost, while the other at 30° of heat is always below the freezing point. These were the only remarks my short stay, in the month of December, could enable me to make. I should, how-